

## Could Andreas Vesalius Have Drawn the Medial Patellofemoral Ligament in *De Humani Corporis Fabrica* (1543)?

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### Abstract

*The Vesalius's drawings are known for the richness in detail which was produced in 1543. Revisiting the drawings, we suggest that the medial patellofemoral ligament may have already been represented at that time.*

For many centuries, once upon a time, the internal human anatomy could only be appreciated serendipitously, be it by glancing at skeletal remains from raided cemetery tombs or when the thoracic-abdominal viscera were exposed either in battle or when corpses were prepared for mummification. Deliberate opening of a human body to examine its content, however, violated all legal and culturally acceptable limits and was strictly forbidden (Standing et al., 2016).

Before the Renaissance, knowledge on human anatomy was based on animal dissection, which was then extrapolated to humans by approximation. Early in the Renaissance, studies involving human cadavers were authorized, which propelled an exponential development in this field, the results of which are still seen today. Andreas Vesalius, Belgian doctor, is regarded as the father of modern anatomy due to his masterpiece *De Humani Corporis Fabrica* (1543) (Mesquita et al., 2015), and some of his human anatomy drawings display an incredible wealth of detail even when compared to contemporaneous anatomy text books. Findings or classifications in the area of the patellofemoral joint are sadly complicated by a lack of consensus on nomenclature, causing a great deal of confusion amongst different readers, which could easily be resolved should the scientific and medical communities be able to agree on a single definition of terms (Grelsamer, 2005). In 2013, an article described a so-called novel ligament within the anterolateral joint of the knee in humans, which gained much media coverage worldwide (Claes et al., 2013). Interestingly, in 1879, a French surgeon named Segond had already scrutinized the anatomical landmarks in this region (Cavaignac et al., 2016).

Nowadays, the medial patellofemoral ligament (MPFL) is regarded as a primary restrictor of medialization forces to the patella. It was first described as a structure in layer II on the medial aspect of the knee (Marshall & Warren, 1979). The MPFL is a 53-mm long and thin fascial band attached to the medial femoral epicondyle and the medial border of the patella (Amis et al., 2003). A subsequent study suggested, however, that such ligament was present only in 35% of analyzed individuals (Reider et al., 1981) though most recent studies have demonstrated that this prevalence could be as high as 100% (Steensen et al., 2004). The MPFL is also considered a crucial structure for medial patellar stability and, therefore, reconstructive surgery is highly regarded in the treatment of patellofemoral dislocation (Hautamaa et al., 1998). How novel can a ligament discovery actually be? Could anatomists from centuries ago have seen it all before? Are we re-inventing the wheel? By revisiting the illustrations in *De Humani Corporis Fabrica* (1543) by Andreas Vesalius, one is able to see the MPFL depicted on the medial aspect of the knee, with its femoral and patellar insertions, though the author sadly failed to give it a name. Figure 1A represents a superficial anatomy view of the knee showing very clearly the MPFL on the right side of the picture (Figure 1B, arrow). Detailed drawings described therein surpassed any previous representations of the dissected human body and are arguably the most important of all illustrations in the history of medical science. The process of planning, designing, outlining and executing is one of the most remarkable in the history of anatomy illustration art (Kemp, 1970). The work by Andreas Vesalius in *De Humani Corporis Fabrica* far exceeds expectations in terms of quality, especially taking into account the historical period in which it was conceived (1543). Vesalius' drawing precision was exquisite and, in our view, the detail with which the MPFL was illustrated is frankly outstanding. Perhaps a shadow produced by the vast vastus medialis muscle is oblique?

We do not think so. We believe that this and other anatomy geniuses have yet more surprises in store awaiting those willing to investigate them.

### **Legends**

Figure1: (A) Illustration from *De Humani Corporis Fabrica*, depicting the knee, where a well demarcated structure on the right, going from the medial epicondyle to the patella (MPFL). (B) Amplified view (arrow) – the ligament itself.

### **Conflict of interesting**

The authors declare no conflict of interest.

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